

CLAIMS

1. (currently amended) An electrostatic wafer holding apparatus, comprising:
an electrostatic chucking pedestal configured for wafer retention
thereupon, said electrostatic chucking pedestal having a plurality of gas channels formed
through a top surface thereof;
a bi-directional backside conduit in fluid communication with a backside
of said chucking pedestal and said plurality of gas channels;
said bi-directional backside conduit in fluid communication with a
backside carrier gas supply line; and
said bi-directional backside conduit further in fluid communication with a
vacuum supply line, wherein said plurality of gas channels are configured to facilitate
vacuum assisted chucking of a wafer retained on said electrostatic chucking pedestal,
during which vacuum assisted chucking an electrostatic chucking voltage remains applied
to the electrostatic chucking pedestal, wherein the vacuum assisted chucking is
implemented prior to performing a wafer processing operation for which the wafer is
chucked;
a mechanism for selectively coupling said bi-directional backside conduit
to one of said backside carrier gas supply line and said vacuum supply line; and
detection circuitry for detecting a curvature present in a wafer placed on
said chucking pedestal, said detection circuitry configured to cause said bi-directional
backside conduit to be decoupled from said backside carrier gas supply line and coupled
to said vacuum supply line upon said detecting a curvature present in said wafer, and said
detection circuitry further configured to cause said bi-directional backside conduit to be
decoupled from said vacuum supply line and re-coupled to said backside carrier gas
supply line upon detecting a desired pressure between said wafer and said chucking
pedestal.

2-5. (cancelled)

6. (currently amended) An electrostatic wafer holding apparatus,
comprising:

an electrostatic chucking pedestal configured for wafer retention thereupon, said chucking pedestal having an inner zone and an outer zone, the inner and outer zones each having a top surface disposed beneath a wafer placed on said chucking pedestal;

a bi-directional backside conduit in fluid communication with a backside of said chucking pedestal;

said bi-directional backside conduit in fluid communication with a backside carrier gas supply line; and

said bi-directional backside conduit further in fluid communication with a vacuum supply line;

wherein said inner zone and said outer zone are mechanically decoupled from one another such that the top surface of the outer zone is capable of selective adjustment to positions both below and above the top surface of the inner zone; and

wherein said electrostatic chucking pedestal further comprises a plurality of gas channels formed through a top surface thereof, said plurality of gas channels also in fluid communication with said bi-directional backside conduit, and wherein said plurality of gas channels are configured to facilitate vacuum assisted chucking of a wafer retained on said electrostatic chucking pedestal, during which vacuum assisted chucking an electrostatic chucking voltage remains applied to the electrostatic chucking pedestal, and wherein the vacuum assisted chucking is implemented prior to performing a wafer processing operation for which the wafer is chucked

a mechanism for selectively coupling said bi-directional backside conduit to one of said backside carrier gas supply line and said vacuum supply line; and

detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal, wherein said detection circuitry is configured to cause said bi-directional backside conduit to be decoupled from said backside carrier gas supply line

and coupled to said vacuum supply line upon said detecting a curvature present in said wafer, and wherein said detection circuitry is further configured to cause said bi-directional backside conduit to be decoupled from said vacuum supply line and re-coupled to said backside carrier gas supply line upon detecting a desired pressure between said wafer and said chucking pedestal.

7-10. (cancelled)

11. (original) The apparatus of claim 6, further comprising a suitable micro-positioning control mechanism associated with each of said inner and outer zones of said chucking pedestal, wherein a height of said inner and outer zones are independently adjustable with respect to one another.

12. (previously presented) The apparatus of claim 11, wherein said outer zone is configured to be in a raised position with respect to said inner zone when a wafer having a positive radius of curvature with respect to said chucking pedestal is placed upon said chucking pedestal.

13. (previously presented) The apparatus of claim 12, wherein said inner zone is configured to be in a raised position with respect to said outer zone when a wafer having a negative radius of curvature with respect to said chucking pedestal is placed upon said chucking pedestal.

14. (currently amended) A method for implementing pressure assisted electrostatic chucking, the method comprising:

placing a wafer onto an electrostatic chucking pedestal;

introducing a supply of backside carrier gas to a backside of said electrostatic chucking pedestal, said electrostatic chucking pedestal having a plurality of gas channels formed through a top surface thereof;

monitoring a pressure between said wafer and said electrostatic chucking pedestal to determine whether a threshold level of chucking force exists; ~~and~~

decoupling said backside carrier gas from said backside of said electrostatic chucking pedestal and coupling said backside of said electrostatic chucking pedestal to a vacuum supply whenever the actual level of chucking force is less than said threshold level of chucking force, wherein said plurality of gas channels are configured to facilitate vacuum assisted chucking of the wafer, during which vacuum assisted chucking an electrostatic chucking voltage remains applied to the electrostatic chucking pedestal, wherein the vacuum assisted chucking is implemented prior to performing a wafer processing operation for which the wafer is chucked; and

decoupling said vacuum supply from said backside of said electrostatic chucking pedestal and coupling said backside of said electrostatic chucking pedestal to said backside carrier gas whenever the actual level of chucking force meets said threshold level of chucking force.

15. (original) The method of claim 14, further comprising introducing a front side supply of gas in conjunction with said vacuum supply.

16. (cancelled)

17. (original) The method of claim ~~14~~14, further comprising increasing an electrostatic chucking voltage applied to said electrostatic chucking pedestal whenever said coupling of said backside of said electrostatic chucking pedestal to said vacuum supply is insufficient to create said threshold level of chucking force.

18. (original) The method of claim 17, further comprising determining a defective wafer condition whenever said coupling of said backside of said electrostatic chucking pedestal to said vacuum supply is insufficient to create said threshold level of chucking force and said electrostatic chucking voltage exceeds a maximum established

value thereof.

19. (previously presented) The apparatus of claim 6, wherein said inner zone is concentrically disposed with respect to said outer zone.

20. (cancelled)